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Our ref: CER 296

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of: C. MCBRIDE et al.:

Group : 1616

Serial No. : 10/023,671 :

Filed : December 18, 2001

: Examiner: L. Wong

Title : FLAVOR STABILIZATION :
IN FOODS

DECLARATION

Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

S i r:

I, Allan R. Hedges, hereby declare and say as follows:

1. I am one of the named inventors of the instant Application.
2. I am aware that the Examiner has rejected claims 6-9 of the instant Application based on Anonymous

(508653 FSTA), Furata (448203 FSTA) and Reineccius (1988(10):T0028 FSTA).

3. In order to demonstrate the surprising and unexpected results obtained by adding a cyclodextrin encapsulated flavor to food in order to stabilize the flavor after the food has been subject to microwave cooking or frozen storage, tests have been performed and are reported herein. These tests have been performed by me or under my direct supervision and control.
4. Flavor encapsulation was performed according to two different applications. In the first application, a raspberry fruit flavor was encapsulated in beta cyclodextrin before being added to a raspberry glaze and subjected to microwave cooking or frozen storage. Alternatively, the raspberry fruit flavor was encapsulated in gamma cyclodextrin before being added to the raspberry glaze and subjected to microwave cooking. In the second application, an essential oil flavor, onion, was encapsulated in beta cyclodextrin before being added to onion

gravy and subjected to microwave cooking or frozen storage. The raspberry glaze was prepared in accordance with the method described on pages 8-9 of the Application, while the onion gravy was prepared in accordance with the method described on pages 10-11 of the Application. The amounts of added beta cyclodextrin and gamma cyclodextrin are listed on page 8-10 of the Application.

5. In order to generate comparative data, raspberry fruit flavor and onion flavor were instead encapsulated in gum arabic and plated onto maltodextrin in the first application and in the second application. The amounts of added gum arabic and maltodextrin are listed on page 8-10 of the Application.
6. Flavor encapsulation using beta cyclodextrin, gamma cyclodextrin and gum arabic was achieved by a co-precipitation method followed by spray drying. The flavor load levels in the encapsulated products and the plated products were determined via solvent extraction-gas chromatography method. These load levels were

used to adjust the formulation so that the same amount of flavor was added for each application. The flavor load levels were equal to those presented on page 7 of the Application.

7. The raspberry glaze of the first application and the onion flavor of the second application were evaluated by a sensory panel. The sensory panel consisted of individuals trained in sensory evaluation techniques. The panel gave rating results from 1 to 10 (lowest to highest) based on flavor intensity, ranking results from 1 to 3 (highest to lowest) and stated their preference between the evaluated applications.

8. The panelists were first asked to rate, rank and state their preference between the microwaved raspberry glaze containing flavor encapsulated in beta cyclodextrin and gum arabic and plated onto maltodextrin. The results of these evaluations are shown in Table 1.

TABLE 1
RASPBERRY GLAZE APPLICATION
MICROWAVED

	RATING	RANKING	PREFERENCE **
BETA CYCLODEXTRIN	7.82	69%	53%
GUM ARABIC	6.68	23%	31%
MALTODEXTRIN	4.7	8%	4%

** 12% OF PANELISTS HAD NO PREFERENCE

9. As illustrated in Table 1, flavor encapsulated in beta cyclodextrin received the highest flavor rating (7.82/10), ranked first in flavor intensity 69% of the time; and was preferred by 53% of the panelists. In summary, beta cyclodextrin performed better than both the gum arabic encapsulated flavor and the maltodextrin plated flavor in all categories.

10. The panelists were also asked to rate, rank and state their preference between the microwaved raspberry glaze containing flavor encapsulated in gamma cyclodextrin and gum arabic and plated onto maltodextrin. The results of these evaluations are shown in Table 2.

TABLE 2
RASPBERRY GLAZE APPLICATION
MICROWAVED

	RATING	RANKING	PREFERENCE
GAMMA CYCLODEXTRIN	5.15	54%	37%
GUM ARABIC	4.57	29%	N/A
MALTODEXTRIN	4.59	25%	N/A

11. As illustrated in Table 2, flavor encapsulated in gamma cyclodextrin received the highest flavor rating (5.15/10), ranked first in flavor intensity 54% of the time, and was preferred by 37% of the panelists. In summary, gamma cyclodextrin once again performed better than both the gum arabic encapsulated flavor and the maltodextrin plated flavor in all categories.

12. The panelists were next asked to rate, rank and state their preference between the frozen raspberry glaze containing flavor encapsulated in beta cyclodextrin and gum arabic and plated onto maltodextrin. The results of these evaluations are shown in Table 3.

TABLE 3
RASPBERRY GLAZE APPLICATION
FROZEN

	RATING			RANKING		PREFERENCE
	FLAVOR INTENSITY POST ONE FREEZE THAW	FLAVOR INTENSITY POST 4 DAYS STORAGE	CHANGE IN FLAVOR INTENSITY RATING WITH EXTENDED FREEZER STORAGE	ONE DAY FREEZE THAW CYCLE	FOUR DAYS FREEZER STORAGE	
BETA CYCLODEXTRIN	5.14	5%	12.2%	41%	58%	53%
GUM ARABIC	5.07	5%	18.7%	35%	33%	28%
MALTODEXTRIN	4.85	3%	33.8%	24%	13%	18%

13. As illustrated in Table 3, flavor encapsulated in beta cyclodextrin maintained the highest flavor intensity after 4 days storage (12.2%). In addition, flavor encapsulated in beta cyclodextrin ranked first in flavor intensity 41% of the time after a one day freeze thaw cycle and ranked first 58% of the time after a four day freeze cycle. Furthermore, the percentage of panelists who ranked beta cyclodextrin first increased from the one day freeze cycle to the four day freeze cycle, while gum arabic and

maltodextrin decreased. In summary, beta cyclodextrin performed better than both the gum arabic encapsulated flavor and the maltodextrin plated flavor in all categories.

14. The panelists were also asked to rate, rank and state their preference between the microwaved onion gravy containing flavor encapsulated in beta cyclodextrin and gum arabic and plated onto maltodextrin. The results of these evaluations are shown in Table 4.

TABLE 4
ONION GRAVY APPLICATION
MICROWAVED

	RATING	RANKING	PREFERENCE --
BETA CYCLODEXTRIN	6.68	52%	43%
GUM ARABIC	6.1	43%	33%
MALTODEXTRIN	3.69	5%	14%

-- 10% OF PANELISTS HAD NO PREFERENCE

15. As illustrated in Table 4, flavor encapsulated in beta cyclodextrin received the highest flavor rating (6.68/10), ranked first in flavor intensity 52% of the time, and was preferred by 43% of the panelists. In summary, beta cyclodextrin performed better than both the gum

arabic encapsulated flavor and the maltodextrin plated flavor in all categories.

16. The panelists were finally asked to rate, rank and state their preference between the frozen onion gravy containing flavor encapsulated in beta cyclodextrin and gum arabic and plated onto maltodextrin. The results of these evaluations are shown in Table 5.

TABLE 5
ONION GRAVY APPLICATION
FROZEN

	RATING	RANKING	PREFERENCE
BETA CYCLODEXTRIN	6.45	N/A	N/A
GUM ARABIC	5.93	N/A	N/A
MALTODEXTRIN	2.90	N/A	N/A

17. As illustrated in Table 5, flavor encapsulated in beta cyclodextrin received the highest flavor rating (6.45/10). Flavor intensity rankings and preference data was not recorded. In summary, beta cyclodextrin performed better than both the gum arabic encapsulated flavor and the maltodextrin plated flavor.

18. In all demonstrated microwaved and frozen applications, flavors encapsulated in cyclodextrin proved to perform better than both the flavors encapsulated in gum arabic and the flavors plated onto maltodextrin. The panelists always perceived cyclodextrin encapsulated flavors to have a higher flavor intensity level even though an equal amount of flavor was used in all applications. In addition to higher flavor intensity rating, the flavors encapsulated in cyclodextrin were perceived to have the best flavor.
19. I find these results to be surprising and unexpected because one would not expect that flavor encapsulation using cyclodextrin would perform better than conventional flavor encapsulation using gum arabic and conventional plating onto maltodextrin.

It is declared by undersigned that all statements made herein of undersigned's own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made

are punishable by fine or imprisonment, or both, under section 18 U.S. Code 1001, and that such willful false statements may jeopardize the validity of this Application or any patent issuing thereon.



Allan R. Hedges

Dated: This 8 day of December, 2003.